**SA WG2 Meeting #156E (e-meeting) S2-230xxxx**

**April 17 – 21, 2023 *revision of S2-230xxxx***

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **x** |

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| ***Title:*** | Corrections for unicast tunnel establishment for MBS broadcast | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, Nokia Shanghai-bell | | | | | | | | | |
| ***Source to TSG:*** | S2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** |  | | | | |  | ***Date:*** | | | April 7th, 2023 |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***Release:*** | | | Rel-17 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
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| ***Reason for change:*** | | For unicast transport, the establishment of the DL tunnel from MB-UPF towards NG RAN node is requested by the RAN node via the inclusion of appropriate information in the N2 container within the MBS Session Resource Setup Response (step 6 in Figure 7.3.1-1), but the related text is in wrongly placed step 5.  In Figure 7.3.2-1, the wrong Figure is referenced in steps 2 and 9 while the description of those text is correct. | | | | | | | | |
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| ***Summary of change:*** | | Text about the establishment of the DL tunnel from MB-UPF towards NG RAN node is shifted towards step 6 in Figure 7.3.1-1.  In Figure 7.3.2-1, steps 2 and 9 are corrected to refer to the right figure. | | | | | | | | |
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| ***Consequences if not approved:*** | | Unclear procedures for unicast tunnel establishment for MBS broadcast. | | | | | | | | |
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| ***Clauses affected:*** | | 7.3.1, 7.3.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **x** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

### 7.3.1 MBS Session Start for Broadcast

The Broadcast MBS Session Start follows the common procedure specified in clause 7.1.1.2 or clause 7.1.1.3, which consist of TMGI Allocation and MBS Session Create. It is possible for AF to allocate TMGI once but create the MBS Session for multiple times. A combined procedure to perform both TMGI allocation and MBS Session Create is available.

The TMGI Allocation is used by AF to obtain the TMGI as MBS Session ID (i.e. TMGI) and perform service announcement towards UEs.

The MBS Session Create (with MBS service type set to broadcast service) is used by the AF to indicate the impending start of the transmission of MBS data, and to provide the session attributes, so that resources for the MBS Session are set up in the MB-UPF and in the NG-RAN for 5GC Shared MBS traffic delivery. The MBS Session Create can be used if TMGI has not been allocated. In this case, MB-SMF will allocate a unique TMGI for the AF and then start the MBS Session.

NOTE 1: When the multicast transport between NG-RAN and MB-UPF is described below, source specific multicasting is assumed.

To receive the data of broadcast communication service, the UE needs to obtain the service announcement information using the methods defined in clause 6.11.



Figure 7.3.1-1: MBS Session Establishment for Broadcast

0 Based on OAM configuration, RAN nodes announce in SIBs over the radio interface information about the MBS FSA IDs and frequencies of neighbouring cells.

1. To establish broadcast MBS session, the AF performs TMGI allocation and MBS session creation as specified in clause 7.1.1.2 or 7.1.1.3. The MBS service type indicates to be broadcast service. The MBS FSA ID(s) of a broadcast MBS session are communicated in the service announcement towards the UE. The UE compares those MBS FSA IDs(s) with the MBS FSA ID(s) in SIBs for frequency selection.

2. The MB-SMF may use NRF to discover the AMF(s) supporting MBS based on the MBS service area and select the appropriate one(s). Then the MB-SMF sends the Namf\_MBSBroadcast\_ContextCreate (TMGI, N2 SM information ([LL SSM], 5G QoS Profile), MBS service area, [MBS FSA ID(s)]) messages to the selected AMF(s) in parallel if the service type is broadcast service. The MB-SMF may include a maximum response time in the request.

3. The AMF transfers the MBS Session Resource Setup Request message, which contains the N2 SM information in the received Namf\_MBSBroadcast\_ContextCreate Request to all NG-RANs which support MBS in the MBS service area. The AMF includes the MBS service area.

4. NG-RAN creates a Broadcast MBS Session Context and stores the TMGI and the QoS Profile in the MBS Session Context. The LL SSM are optional parameters and only provided by MB-SMF to NG-RAN if N3mb multicast transport is configured to be used in the 5GC. If MBS FSA ID(s) were received, the NG-RAN may use those MBS FSA ID(s)s to determine cells/frequencies within the MBS service area to broadcast MBS session data based on OAM configuration about the MBS FSA IDs and related frequencies.

5. If NG-RAN prefers to use N3mb multicast transport (and if LL SSM is available in NG-RAN), the NG-RAN joins the multicast group (i.e. LL SSM).

6. The NG-RAN reports successful establishment of the MBS Session resources (which may include multiple MBS QoS Flows) by sending MBS Session Resource Setup Response (TMGI, N2 SM information ([N3mb DL Tunnel Info])) message(s) to the AMF. If NG-RAN prefers to use N3mb unicast transport (or if the LL SSM is not available in NG-RAN) between the NG-RAN and MB-UPF, NG-RAN provides its N3mb DL Tunnel Info as part of the N2 SM information. For more details, refer to TS 38.413 [15].

7. The AMF transfers the Namf\_MBSBroadcast\_ContextCreate Response () to the MB-SMF. The AMF should respond success when it receives the first success response from the NG-RAN(s). And if all NG-RAN(s) report failure, the AMF should respond failure. The MB-SMF stores the AMF(s) which responds success in the MBS Session Context as the downstream nodes. If the AMF receives the NG-RAN response(s) from all involved NG-RAN(s), the AMF should include an indication of completion of the operation in all NG-RANs. If received from NG-RAN node, the N3mb DL Tunnel Info and NG-RAN ID are included in the response.

8. [Conditional] If N3mb unicast transport is to be used (i.e. N3mb DL Tunnel Info is present in the Namf\_MBSBroadcast\_ContextCreate Response message from AMF) in a deployment where NG-RAN nodes share a common user plane entity, the MB-SMF only establishes the shared tunnel towards the DL GTP tunnel endpoint if the shared tunnel has not yet been established (as determined based on the stored DL GTP Tunnel endpoint(s) for the MBS session). The MB-SMF also stores the received DL GTP Tunnel and corresponding NG-RAN Node ID for the MBS session. For the deployment where NG-RAN nodes do not share a common user plane entity, the DL GTP tunnel will not be used by other NG-RAN nodes. In a deployment where NG-RAN nodes do not share a common user plane entity, the MB-SMF always establishes the shared tunnel towards the DL GTP tunnel endpoint.

To establish the shared tunnel towards the DL GTP tunnel endpoint, the MB-SMF sends an N4mb Session Modification Request to the MB-UPF to allocate the N3mb unicast transport tunnel for a replicated MBS stream for the MBS Session.

8a-8b. If the AF subscribed to a Delivery Status Indication (see clause 7.3.5), the MB-SMF notifies the AF as specified in step 2 of clause 7.3.5. The MB-SMF notifies the AF directly by invoking Nmbsmf\_MBSSession\_StatusNotify service operation, or the MB-SMF notifies the AF via NEF/MBSF (if deployed) by invoking Nmbsmf\_MBSSession\_StatusNotify service operation to the NEF/MBSF which then invokes Nnef\_MBSSession\_StatusNotify service operation to the AF.

9. NG-RAN broadcasts the TMGI representing the MBS service over radio interface. Step 9 can take place in parallel with step 6.

10. Another NG-RAN may report successful establishment of the MBS Session resources (which may include multiple MBS QoS Flows) by sending MBS Session Resource Setup Response (TMGI, N2 SM information ([N3mb DL Tunnel Info])) message after the AMF transferred the Namf\_MBSBroadcast\_ContextCreate Response () to the MB-SMF.

11. The AMF transfers the Namf\_MBSBroadcast\_ContextStatusNotify request () to the MB-SMF. When the AMF receives the response from all NG-RAN nodes, the AMF includes an indication of the completion of the operation. If the AMF does not receive responses from all NG-RAN nodes before the maximum response time elapses since the reception of the Namf\_MBSBroadcast\_ContextCreate Request, then the AMF should transfer the Namf\_MBSBroadcast\_ContextStatusNotify request () which indicates partial success or failure.

12. [Conditional] If N3mb unicast transport is to be used (i.e. N3mb DL Tunnel Info is present in the MBS Session Start Response message from AMF), the handling in MB-SMF and MB-UPF is the same as specified in step 8.

13. The AF starts transmitting the DL media stream to MB-UPF using the N6mb Tunnel, or optionally un-tunnelled i.e. as an IP multicast stream using the HL MC address.

14. The MB-UPF transmits the media stream to NG-RAN via N3mb multicast transport or unicast transport.

15. The NG-RAN transmits the received DL media stream using DL PTM resources.

NOTE 2: Steps 6-8 and 2-4 are comparable to steps 2-5 and 6-7 in clause 7.2.1.4, respectively.

### 7.3.2 MBS Session Release for Broadcast

The MBS Session Release for broadcast follows the MBS Session Deletion (e.g. TMGI De-allocation and MBS Session Deletion) so that resource for shared MBS delivery is released. It is possible for AF to stop MBS Session but keep TMGI allocated.

Figure 7.3.2-1: MBS Session Release for Broadcast

1. The AF/AS may stop the media stream before sending the MBS Session Release Request (TMGI) message to the 3GPP network.

2. The AF/AS performs MBS Session Deletion procedure to request release of MBS Session (steps 1 ~ 10 in figure 7.1.1.4-1, or steps 1 ~ 13 in figure 7.1.1.5-1).

3. MB-SMF sends Namf\_MBSBroadcast\_ContextRelease request (TMGI) to the AMF(s) that has been involved in the MBS Session.

4. The AMF sends an N2 message to all RAN nodes that have been involved to release MBS session. If a NG-RAN node receives multiple N2 message to release the MBS Session for the same TMGI (e.g. from several AMFs the NG-RAN is connected to), NG-RAN only performs step 5 and step 6 once.

5. The NG-RAN stops the PTM transmission.

6. If N3mb multicast transport has been used, the NG-RAN sends a Leave message (LL SSM) to stop the media stream to this NG-RAN node. If N3mb unicast transport has been used, the NG-RAN releases the resources for its DL N3mb Tunnel. NG-RAN deletes its MBS Session Context.

7. The NG-RAN reports successful release of resources for the MBS Session by sending MBS Session Resource Release Response (TMGI) message(s) to the AMF(s).

8. The AMF sends Namf\_MBSBroadcast\_ContextRelease response (TMGI) to the MB-SMF.

9. The AF may start a TMGI de-allocation procedure (steps 11 ~ 14 in figure 7.1.1.4-1, or steps 14 ~ 17 in figure 7.1.1.5-1).